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APPLICATION

FOR

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TITLE: SEALING ORGANIC LIGHT EMITTING DEVICE DISPLAYS

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SEALING ORGANIC LIGHT EMITTING DEVICE DISPLAYS

Background

This invention relates generally to organic light emitting device (OLED) displays.

Organic light emitting devices use an organic or material that emits light. One type of OLED material is a polymer material. These devices are useful in displays for electronic devices. An organic material that is light emissive may be sandwiched between row and column electrodes. When a potential is applied to the light emitting material, it emits light of a particular wavelength. The emitted light passes through the column electrode that may be transparent in some embodiments. Organic light emitting devices offer the potential for relatively low cost displays made from organic light emitting material.

One problem with organic light emitting materials is that they are relatively sensitive to moisture, oxygen and common solvents. Thus, even during the manufacturing process, the organic light emitting materials may be attacked by moisture and oxygen in the surrounding atmosphere and solvents used in the remaining portions of the manufacturing process.

The organic light emitting materials are not totally compatible with conventional passivation materials. Common passivation materials are inorganic materials such as silicon nitride, phosphosilicate glass and silicon carbide. Still another problem is that many of these common passivation materials require deposition temperatures that exceed the temperatures at which organic light emitting materials may be properly processed.

Thus, there is a need for better ways to prevent organic light emitting materials from being contaminated.

Brief Description of the Drawings

Figure 1 is a side elevational view of one embodiment of the present invention;

Figure 2 is an enlarged side view of a module shown in Figure 1 in one embodiment of the present invention; and

Figure 3 is a top plan view of the embodiment shown in Figure 1.

Detailed Description

Referring to Figure 1, an organic light emitting device (OLED) display may include a back plate 16 secured to a front plate 12. In one embodiment, the organic light emitting material is secured to the interior side of a transparent front plate 12. A filler material 14 may be applied between the front and back plates 12 and 16. The material 14 may include a standard epoxy utilized for

device assembly back fill processes in one embodiment. A desiccant compound, such as silica or zeolite material, may be mixed into the filler material 14.

The back plate 16 may be a glass or ceramic layer that is impervious to the ambient including moisture. An adequate offset of the front panel 12 from the edges provides the necessary diffusion distance to achieve an acceptable lifetime.

Referring to Figure 2, in accordance with one embodiment, each of the front plates 12 may be a module including a transparent substrate 20 surface mounted by surface mount material 28 to a back plate 22. In one embodiment, the back plate 22 may be a ceramic plate. The back plate 22 may receive integrated circuit driver devices and may transmit the signals from the driver devices (not shown) through the solder balls 28 to row and column electrodes (not shown) deposited over the substrate 20. Organic light emitting material may be deposited on the substrate 20 on the rear side thereof as indicated at 26. Light emitted by the light emitting material passes outwardly through the front plate 20. The region remaining between the front plate 20 and the rear plate 22 may be filled with the material 14.

In an implementation for array displays, such offsets may not be acceptable. The OLED structure may extend to the end of the display module array displays. Additional

protection can be achieved through the use of the filler material 14 to fill the seams between neighboring modules of array displays.

As shown in Figure 3, a plurality of modules 12 may be abutted side-to-side, each module 12 abutting the lateral extension of the filler material 14 and sealing the joints within any given array display 10 and between adjacent modules 12.

The desiccant in the filler material 14 traps moisture before it can attack the moisture sensitive organic light emitting materials in the OLED display 10. In addition, the moisture trapping capability is provided between the layers 20 and 22 of each module 12. The desiccant or getter material absorbs moisture and other gases as they diffuse in from the edge of the sandwiched display 10.

Thus, each module 12 may be surrounded by a barrier of desiccant filler material 14 and the front and back plates 12 and 16 may be similarly coated.

In some embodiments, instead of using two layers 12 and 16, a single layer may be utilized. In such case, the single layer may be adhesively secured to a container or can by an adhesive that includes the desiccant material. In a single layer structure, the passivation may be bonded to the can. In still another embodiment, a structure, such as that shown in Figures 1 and 2, may be secured to a

container such as a can by an adhesive that includes a desiccant.

While the present invention has been described with respect to a limited number of embodiments, those skilled in the art will appreciate numerous modifications and variations therefrom. It is intended that the appended claims cover all such modifications and variations as fall within the true spirit and scope of this present invention.

What is claimed is: